Directions

- **Print your name and e-mail ID in the below box right now.**
- **Print your name and e-mail ID on the last page right now.**
- **Enter your signature in the below box after completing the test.**

Name:

E-mail ID:

On my honor, I pledge that I have neither given nor received help on this test.

Signature:

Test rules

- Print your name, id, and pledge as requested.
- This pledged exam is closed textbook. The only device you may access during the test is your own laptop.
- You are not allowed to access class examples or your own past assignments during the test; i.e., the only Python code you may access or view are ones that you develop for this test.
- The only windows that can be open on your computer are PyCharm and a single browser with tabs only open to the class website.
- PyCharm can be used only for developing the programs to be submitted. It cannot be used for the short answer questions.
- Programs should demonstrate proper programming style; e.g., header comments, whitespace, identifier naming, etc.
- Whether a program compiles is important.

1. (10 points) Suppose the following assignments are in effect.

```
r = range(2, 6)
s = [31, 41]
t = [41, 59]
u = ['AB', 'C', 'D', 'EF']
v = ['AB', 'CD']
w = ['CS', 1112]
x = ' CS 1112 '
```

a. What is the first value in range `r`?

b. What is the last value in range `r`?

c. Can the second value in range `r` be changed (yes or no)?

d. Can the second value in list `s` be changed (yes or no)?

e. What is the value of `s + t`?

f. What is the value of `('B' in u)`?

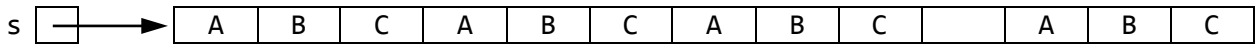
g. What is the value of `u` after `del u[1:3]`?

h. What is the value of `v` after `v.reverse()`?

i. Is `w` a legal Python list (yes or no)?

j. What list is produced by `x.split()`?

2. (10 points) Suppose `s` is a variable representing the string `'ABCABCABC ABC'`



a. What is the length of `s`?

b. What is the index of the first occurrence of `'C'`?

c. What string is produced by the slicing `s[3 : 6]`?

d. What string is produced by `s.replace('C','')`?

e. What is the value of `s.find('b')`?

f. What is the value of `s.rfind('C', 7)`?

g. What slice of `s` is needed to produce the string `'C A'`?

h. How many elements are in the list produced by `s.split()`?

i. What is the value of `s` after `s.lower()`?

j. What is the value of `s.capitalize()`?

3. (1 points) What type of value is printed by the following code segment?

```
import random
r = random.randrange(0,2)
print(r)
```

4. (3 points) What are the possible values printed by the following code segment?

```
import random
r = random.randrange(1, 3)
print(r)
```

5. (3 points) Is it possible for the following code segment to print the same value twice (yes or no)?

```
import random
r1 = random.randrange(1, 3)
r2 = random.randrange(1, 3)
print(r1, r2)
```

6. (3 points) Is it possible for the following code segment to print two different values (yes or no)?

```
import random
random.seed(1112)
r1 = random.randrange(1, 3)
random.seed(1112)
r2 = random.randrange(1, 3)
print(r1, r2)
```

7. (1 point) What is the value of `1 + 1 * 4`?

8. (1 point) What is the difference between the calculations `x/y` and `x//y`?

9. (1 point) Suppose `y` is a numeric variable. Write a Boolean expression that is true if the value of `y` is a birth year for a member of the *millennial generation* (i.e., `y` lies inclusively between 1980 and 1996).

10. (1 point) Write a statement that sets `p` to the value $\frac{9801}{2206\sqrt{2}}$.

11. (1 point) Consider the below code segment.

```
x = ['12', '2', '9', '11']
y = [12, 2, 9, 11]
```

What is the `min(x)`?

What is the `min(y)`?

12. (1 point) Consider the below code segment.

```
s = 'wahoo 3'
t, u = s.split()
```

What is `t`'s type?

What is `u`'s type?

13. (1 point) Suppose `r` is a string containing only base 10 digits. Give an assignment statement that converts `r` to the corresponding numeric value.

14. (1 point) The circumference *c* of a circle is $2\pi r$. Write the corresponding Python statement.

15. (20 points) Develop program `one.py`. The program gets an integer input value `n`. The program prints 1112^{n}. There should be no other output.

    Three sample runs

```
Enter an integer: 3
1375036928
```

```
Enter an integer: 1
1112
```

```
Enter an integer: 4
1529041063936
```

16. (20 points) Develop program `two.py`. The program gets the name of a web file as input. The web file is located in the CS 1112 web folder

    `http://www.cs.virginia.edu/~cs1112/datasets/testing/`

    The web file will contain two numbers `x` and `y`. The program determines and prints the relationship between `x` and `y`; that is equal, ascending, or descending. There should be no other output.

    Some sample data files are available (we will use different files during testing).
    - `a.txt` contains 31 and 41.
    - `b.txt` contains 11 and 11.
    - `c.txt` contains 20 and 15.

    Three sample runs

```
Enter name of web file: a.txt
ascending
```

```
Enter name of web file: b.txt
equal
```

```
Enter name of web file: c.txt
descending
```

17. (20 points) Develop program `three.py`. The program gets two inputs. The first input is a string. The second input is a line of words. The program prints the words on the line that contain the string. There should be no other output.

When matching, case does not matter. For example, `'abc'` matches `'daBChick'`, and `'XY'` matches `'epoxy'`.

Three sample runs

```
Enter word: stir
Enter list of words: The soup was re-stirred with STirLING stirrups
re-stirred
STirLING
stirrups
```

```
Enter word: abc
Enter list of words: The English alphabet goes from a to z
```

```
Enter word: DeF
Enter list of words: The defendant's reasoning was indefensible
defendant's
indefensible
```

Clearly print your name and e-mail id

Name

E-mail ID:

Page 2 _____ **10**	**one.py** _____ **20**
Page 3 _____ **10**	**two.py** _____ **20**
Page 4 _____ **10**	**three.py** _____ **20**
Page 5 _____ **10**	**Total** _____ **100**